

## ***Interactive comment on “Fire weather index: the skill provided by ECMWF ensemble prediction system” by Francesca Di Giuseppe et al.***

**Anonymous Referee #2**

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Di Giuseppe et al. provide an assessment of 10-day Fire Weather Index for different regions of the globe and for three fire events in Mediterranean fire environments, using one year’s worth of data. Both the skill of FWI forecasts are evaluated relative climatology, as is the probability of detection for fire events (characterized by FRP) across the standard GFED fire regions.

The paper provides a useful reference for the ECMWF/JRC’s fire weather products, is well-written and for the most part is technically sound. Specific comments are listed below. The main requirements prior to publication are 1) additional discussion of why the forecast performance varies in different regions in terms of the underlying performance of the weather inputs 2) additional context for the 2017 fire season in different parts of the world.

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\*\*\*\*Specific comments\*\*\*\* L15: suggest changing ‘forestry agencies’ to ‘fire management agencies’

L76: Please list the four weather inputs to the FWI system, and also describe how the ECMWF initializes the moisture codes in the spring and shuts them down in winter in seasonally cold regions (an example for the Canadian Wildfire Information System is described here: <https://cwfis.cfs.nrcan.gc.ca/background/dsm/fwi>).

L80: Abatzoglou et al. (2018) showed that the FWI is correlated with burned area across some, rather than most, non-arid regions. Please list here which regions those were.

L96: by ‘time strips’, do you mean ‘time steps’?

L105: suggest replacing ‘substitutes’ with ‘replaces’.

L111: as far as reanalysis being a good proxy for meteorological observations, please mention the extent to which is the case for the ECMWF products, drawing on Vitolo et al. (2019) for ERA-I, and how this might have changes for ERA5.

L153: suggest changing ‘if there is no ignition’ to ‘if there is no ignition and/or aggressive fire suppression’.

L180: throughout, the BOAS region is missing from the analysis. Was there a reason for this, or should it be added?

L182: As far as performance degradation goes, in Figure 2, the differences between ERA5 and the forecasts can be seen, and the differences between regions can be seen, but the panels in Figure 2 are too small to be able to see any performance degradation with increasing lead time.

L194: In Figure 3, is there a reason for the discontinuity between day-6 and day-7 lead times? Similarly for the more apparent discontinuities in Figure 4 for BONA, SEAS. And for TENA, what is the possible reason why the CRPS is lower at lead 7 than lead

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L199: Change 'Boreas' to 'Boreal'.

L199-L204: It is hard to understand how FWI calibration (in the sense of interpreting it as a fire danger metric) influences forecast performance for different regions. Instead, the differences are more likely due to performance in forecasting the temperature, relative humidity, wind speed and precipitation input variables. Here, please describe possible drivers of these differences in terms of known differences forecast skill for the four inputs, which I trust are evaluated routinely at the ECMWF.

L217: BONA is by definition is not a temperate region, please correct.

L220: change 'false-alarm' to 'false-alarms'?

L222: Reference required for the statement of weather playing a less relevant role compared to fuel availability in this region.

L225: the de Groot et al. (2007) study is only relevant to the EQAS region, not SEAS, and despite recommending other FWI subcomponents, does not appear to say that the FWI is not a good indicator in the area – please correct. Furthermore, while fires in this area are related to land clearing, the Abatzoglou et al. (2018) study shows that the FWI is highly correlated with burned area over EQAS at longer time scales, and as strongly as anywhere else in the world. The much more likely reason for the poor performance was that 2017 was a record low fire year over EQAS (see GFED dry matter emissions estimates here: [https://www.geo.vu.nl/~gwerf/GFED/GFED4/tables/GFED4.1s\\_DM.txt](https://www.geo.vu.nl/~gwerf/GFED/GFED4/tables/GFED4.1s_DM.txt)), and there was simply too little fire activity to make a meaningful prediction, as it was probably too wet for any serious burning. Please correct this, ideally with a brief mention of whether the FWI was anomalously low relative to the ERA5 FWI climatology.

L239: referring to the GFED emissions tables above, 2017 was not extreme across the globe. Please correct.

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